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(54) HIGH-SPEED BALING MACHINE

(57) A high-speed wrapping machine that includes an entry roller section (11); a pallet (6) wrapping platform (1); an exit roller section (12); and at least one spool carriage (55) for wrapping film that can move vertically on a corresponding support arm (5) of the spool carriage (55) that is a notably vertical position, and this arm is linked at its bottom end to a rotating element (2) with respect to the pallet (6) deposited on the platform (1), which is operationally suitable to allow the rotation of the spool carriage (55) around the pallet (6) and to allow the vertical movement thereof. Said rotating element (2), such as a bearing or similar device, is moved by a motor (4) using a drive belt (3).

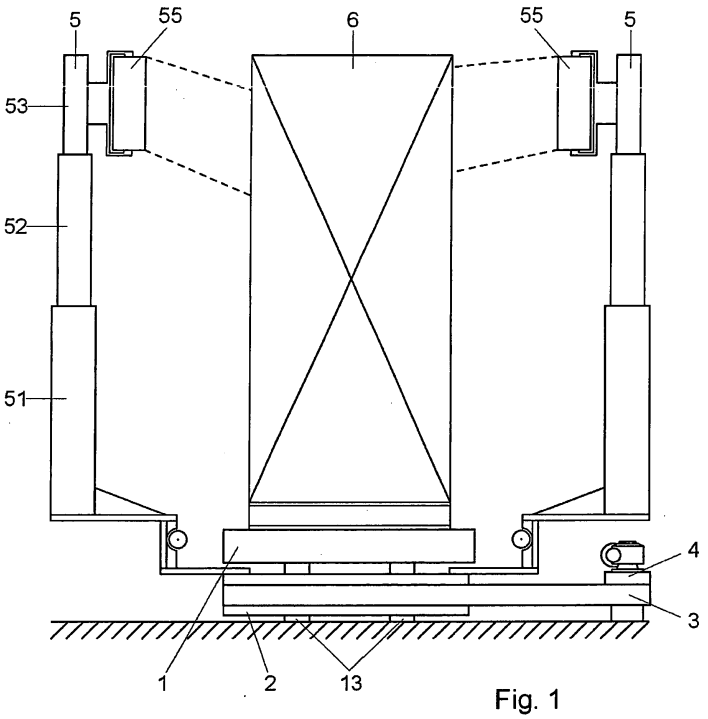

Fig. 1

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Description

Purpose of the invention.

[0001] This invention refers to a high-speed wrapping machine consisting of arms that rotate around a platform where a pallet or package is deposited for subsequent wrapping with plastic film.

Background of the invention.

[0002] Currently, high-speed wrapping machines using plastic film or similar material consist of a structure installed over a wrapping platform, with the platform positioned between an entry section of rollers and an exit section of rollers for the pallets or packages to be wrapped.

[0003] On high-speed wrapping machines, the arms that support the spool carriages are what rotate around the platform where the load to be wrapped is deposited, thereby providing better performance than wrapping machines on which the arm is static and on which it is the platform with the pallet or load that is rotated while the plastic film is applied around it.

[0004] These high-speed wrapping machines, meaning the ones with rotating arms, generally consist of a gantry equipped with legs or supports, large central gears for motorised movement, and one or more arms or columns arranged in cantilever with respect to the upper zone of the gantry and oriented towards the bottom zone. Each one of these arms has a plastic film spool carriage that can move vertically.

[0005] These machines have the inconvenience that, when the spool carriage is at the bottom part of the corresponding arm or column, there is a serious risk of hooking the pallet or load to be wrapped, thereby twisting the arms and subsequently destroying the machine.

[0006] Moreover, the size and volume of the wrapping machine is notorious due to the existence of the upper gantry, such that it exceeds a height of three and a half metres and a span of four metres, thus requiring considerable free height for installation. This volume also complicates the disassembly task at the shop that manufactures the machine and complicates subsequent positioning on trucks and containers to transport it to the customer's facilities.

[0007] These high-speed wrapping machines also present serious problems for maintenance technicians, given that most of the drive mechanisms are located in the upper zone of the gantry so that it is difficult to access and repair the same; given that they involve occupational risks; and given that they frequently require the use of cranes and elevators for disassembly and repair.

Description of the invention

[0008] The high-speed wrapping machine of this invention includes a series of technical particulars that allow simpler, stronger and more reliable construction, in addition to a notable reduction of the wrapping machine's total volume, thereby providing optimised operation and performance that is remarkably greater than known high-speed wrapping machines.

[0009] On the wrapping machine of this invention, the arm fastening and drive elements are located in the zone below the wrapping machine, thereby simultaneously providing easy access for assembly and maintenance, a notable reduction of the wrapping machine's volume by eliminating gantries or drive support structures, and greater ease of transport on trucks or in containers. Moreover, the spool carriage arms are not suspended on a cantilever, wherefore they are stronger.

[0010] This wrapping machine presents at least one arm that holds a spool carriage and that rotates around the wrapping platform. This arm is linked at the bottom end to an element that rotates with respect to the platform designed to support a pallet with the load to be wrapped. The minimum height of the wrapping machine is therefore notably less than that of wrapping machines equipped with a gantry or upper structure.

[0011] The rotating element can be on a bearing or any other element that allows the rotation of the arm or arms, and the rotation movement of the arms is driven by a motor and the corresponding transmission, also positioned at the bottom part of the wrapping machine.

[0012] In order to allow the combined rotational and vertical movement of the spool carriages, the holder arm or arms have been designed to be telescopic, preferably consisting of a pneumatic or hydraulic cylinder.

[0013] All the mechanisms can be controlled automatically by an electrical panel or programmable controller for stand-alone operation.

Description of the figures.

[0014] To complement the description that is being made and in order to facilitate an understanding of the invention's characteristics, a set of drawings has been attached to this descriptive report. These drawings represent the following, as an example but not a limitation of the invention:

Figure 1 shows a schematic elevation view of the high-speed wrapping machine.

Figure 2 shows a ground view of the wrapping machine.

Figure 3 shows an elevation view of one of the arms, cross-sectioned by a vertical plane to allow observation of the interior cylinder.

Figure 4 shows a ground view of an arm, where the telescopic assembly of the elements or profiles that make up the same can be observed.

Preferred embodiment of the invention.

[0015] As it can be observed in the referenced figures,

the wrapping machine includes a platform (1) for receiving the pallet (6) with the load to be wrapped, and this platform (1) is positioned between an entry roller section (11) and an exit roller section (12) of the pallet (6).

[0016] A rotating element (2) such as a bearing is located underneath the platform (1), positioned exteriorly with respect to the support legs (13) of the platform (1) to prevent interference during rotation.

[0017] This rotating element (2) has a throat for installing a belt (3) driven by an electric motor (4), thereby providing the belt with silent and vibration-free operation.

[0018] In turn, the rotating element (2) is prolonged laterally on two supports, which are diametrically opposed, on which the bottom ends of the arms (5) are fastened.

[0019] Each arm (5) includes various telescopic sections (51, 52, 53) that are guided vertically for correct extension and retraction when driven by a hydraulic or pneumatic cylinder (54).

[0020] The last section (53) of the arm (5) supports a spool carriage (55) that moves vertically by extension or retraction of the telescopic sections (51, 52, 53) of the arm (5).

[0021] All the mechanical elements, such as the pneumatic or hydraulic cylinders (54) and the motor (4) are controlled by an electrical panel or programmable controller (not represented).

[0022] Finally, it should be highlighted in the embodiment shown that the wrapper has two spool carriage arms, although it can have additional or fewer arms, depending on the desired performance. If a greater number of arms are equipped, they will be distributed uniformly around the periphery of the wrapping machine, as in the example shown, so that balance is maintained when the arms rotate.

[0023] Having sufficiently described the nature of the invention, as well as an example of the preferred embodiment, it is hereby recorded for the appropriate purposes that the materials, shape, size and layout of the described elements can be modified, as long as it does not mean an alteration of the essential characteristics of the invention that are claimed below.

Claims

1. A high-speed wrapping machine that includes an entry roller section (11); a platform (6) (1) for static positioning of a pallet (6) with the load to be wrapped; an exit roller section (12); and at least one vertical arm that has an associated spool carriage (55); **characterised** because the arms (5) are joined at their bottom end to a rotating element (2) that is installed around the static platform (1) and that is operationally suitable to allow the rotation of the spool carriage (55) around the load positioned on said platform (1).

2. A wrapping machine in accordance with claim 1, **characterised** because the rotating element (2) in charge of supporting the arms (5) is a bearing positioned underneath the platform (1) of the wrapping machine.

3. A wrapping machine in accordance with claim 1, **characterised** because the rotating element (2) is related to a drive motor (4) by a transmission element.

4. A wrapping machine in accordance with claim 3, **characterised** because the transmission element is a belt (3).

5. A wrapping machine in accordance with claim 1, **characterised** because the arm (5) includes several sections (51, 52, 53) that are installed telescopically.

6. A wrapping machine in accordance with claims 1 and 5, **characterised** because each arm (5) includes a hydraulic or pneumatic cylinder (54) for elevation and descent in the vertical direction of the spool carriage (55) associated with the same.

7. A wrapping machine in accordance with claim 1, **characterised** because the motor (4) and the cylinder (54) of the arm (5) are controlled by an electrical panel.

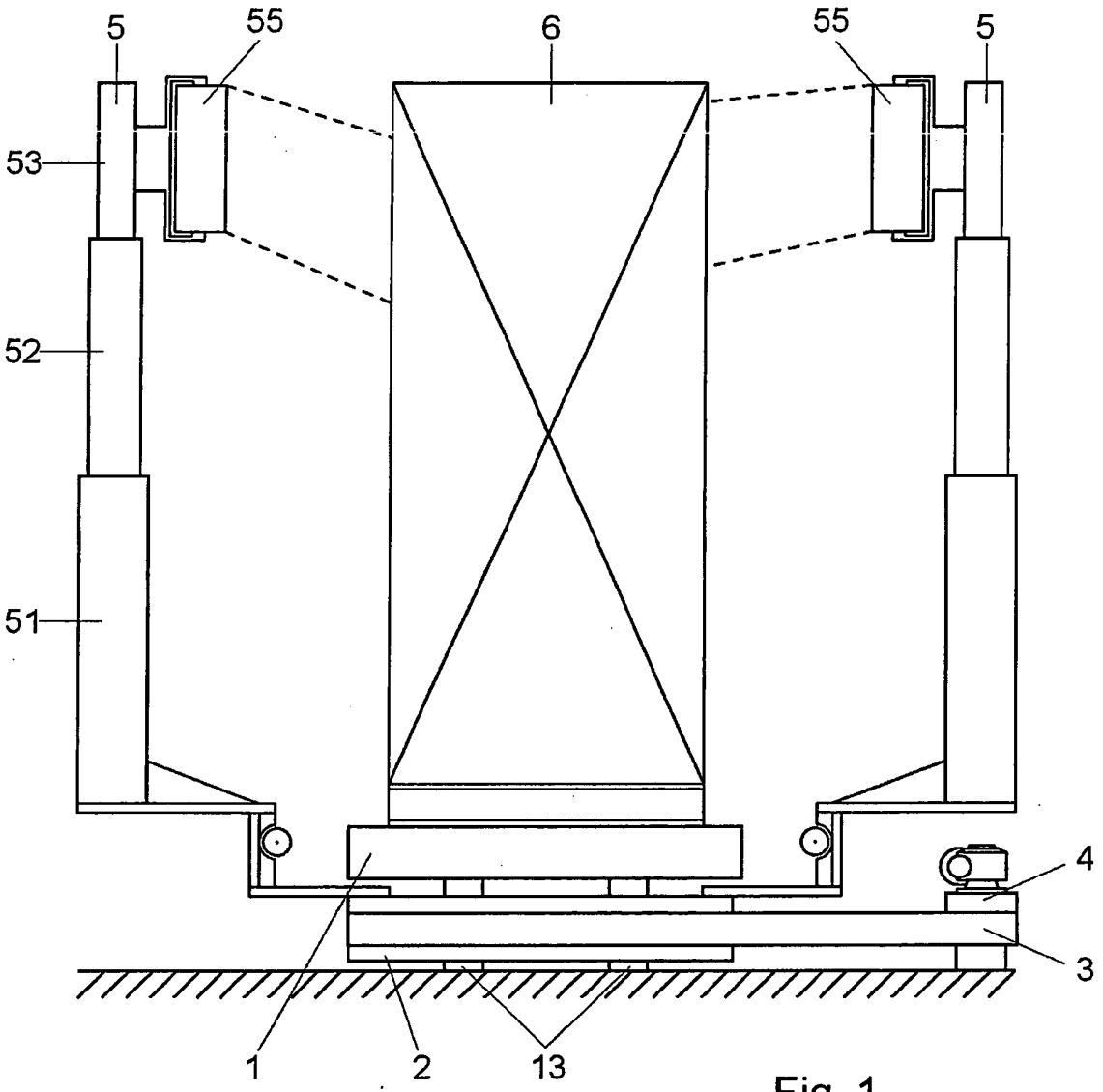

Fig. 1

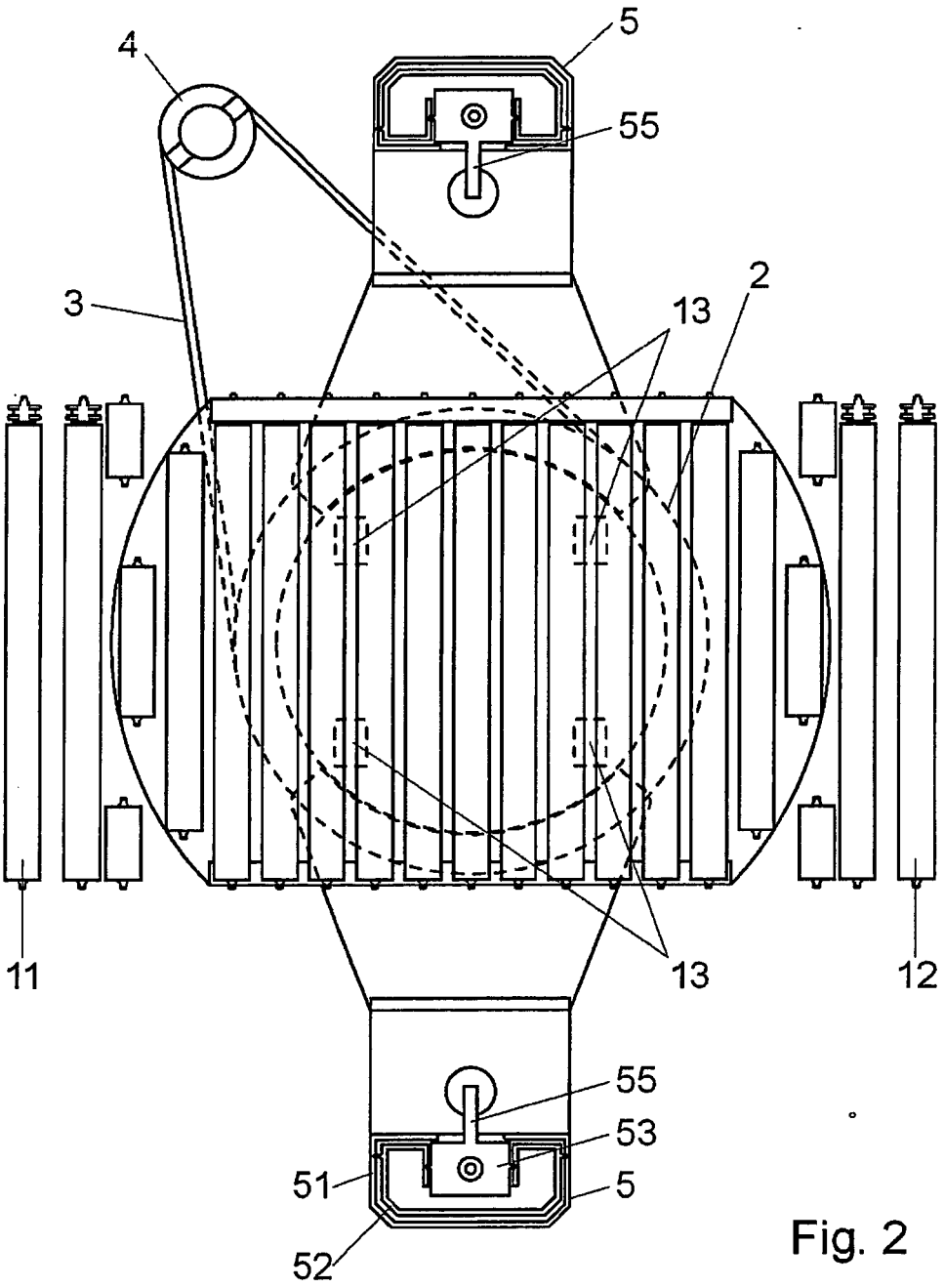

Fig. 2

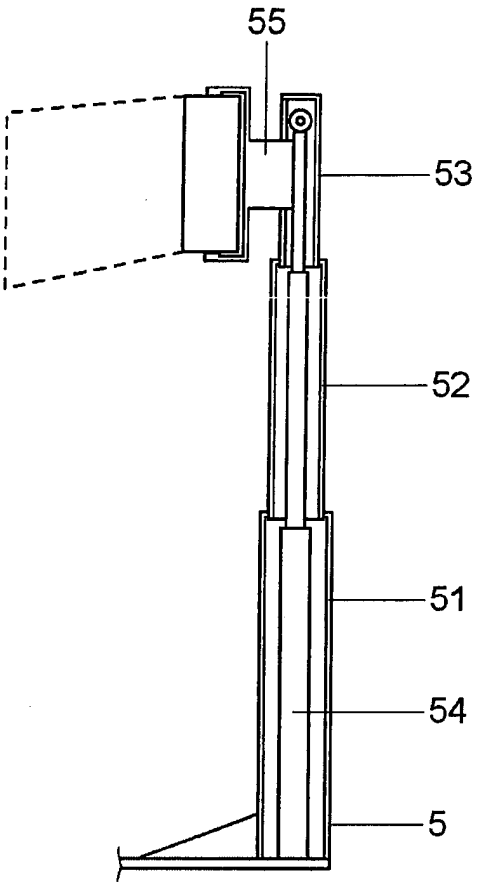

Fig. 3

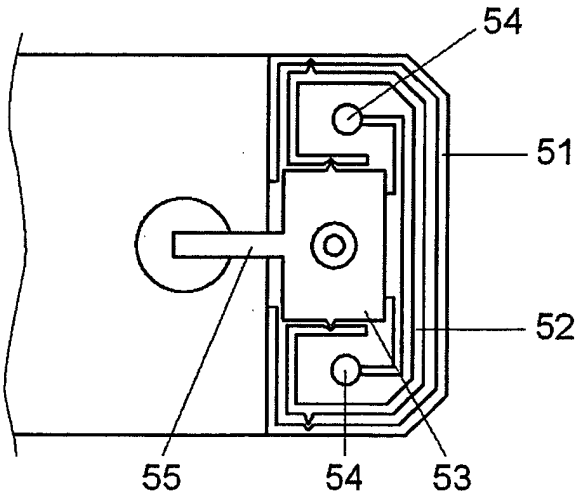

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2006/000600

A. CLASSIFICATION OF SUBJECT MATTER

B65B 11/02 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT,EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ES 8301806 A1 (PIERI SAUNO & RINO) 01.04.1983, Page 11, lines 6-19; figure 5	1,3
Y		2,4-7
Y	EP 1452445 A1 (OY M. HALOILA AB) 01.09.2004, Abstract	2,4
Y	US 6991195 B2 (MAZZAROLO) 31.01.2006, Abstract; figure 1	5
Y	US 5423163 A (WENDT) 13.06.1995, Abstract; figure 1	6,7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2007 (23.03.2007)	
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer F. Monge Zamorano Telephone No. +34 91 349 55 41

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ ES 2006/000600

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